

A new genus and species of freshwater crab from Cameroon, West Africa (Crustacea, Brachyura, Potamoidea, Potamonautidae)

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SYNOPSIS. A new species of freshwater crab from Cameroon, West Africa, is described from specimens held in the Natural History Museum (NHM), London, U.K. and in the Museum für Naturkunde der Humboldt-Universität zu Berlin (MNHU), Germany. After comparison with other genera of freshwater crabs occurring in West Africa the new species was found to represent a new genus.

INTRODUCTION

The present report was prompted by the acquisition of a new freshwater crab specimen from Cameroon by the NHM. The crab was donated in 1987 by Mr David Zeitlin, a Cambridge anthropologist carrying out field work in Cameroon. The specimen was a mature male and proved difficult to identify because its mandibles, gonopods, carapace, and third maxillipeds represented an unusual combination of these important taxonomic characters.

The structure of the mandibles of the specimen placed it in the superfamily Potamoidea Ortmann, 1896 and the family Potamonautidae Bott, 1970, rather than in the Gecarcinucoidea Rathbun, 1904. However, the combination of characters of the third maxillipeds, carapace, and gonopods of this specimen argued against its inclusion in any of the three freshwater crab genera known from West Africa; *Sudanonautes* Bott 1955, *Liberonautes* Bott 1955 and *Potamonautes* Macleay 1838 (Bott, 1955). The specimen was sent to Dr M. Türkay of the Senckenberg Museum for further comment and discussion.

In 1989 one of the authors (NC) examined Zeitlin's fresh-

water crab from Cameroon during a visit to the Senckenberg Museum, but was unable to identify the specimen at that time. In 1991, several other similar specimens, also from Cameroon, were discovered by one of the authors (NC) while making an examination of the collection of freshwater crabs held in the MNHU. The present report arises out of a subsequent reexamination of Zeitlin's specimen from Cameroon during a visit to the NHM. The material in the NHM and the MNHU is described here as a new species belonging to a new genus.

The following abbreviations have been used: CW = carapace width at widest point; CL = carapace length, measured along median line; CT = cephalothorax thickness, maximum depth of cephalothorax; FW = front width, width of front measured along anterior margin.

SYSTEMATIC ACCOUNT

Potamonemus gen. n.

DIAGNOSIS. No flagellum on exopod of third maxilliped. Mandibular palp two-segmented with a single, undivided,

Table 1 *Potamonemus mambilorum* sp. n. from Cameroon, West Africa. Carapace dimensions and proportions relative to the carapace width of all 16 known specimens. (CW = carapace width; CL = carapace length; CT = carapace thickness; FW = front width; n = 16. Measurements of CW, CL, CT and FW in millimetres).

	CW	CL	CT	FW	CL/CW	CT/CW	FW/CW
NHM—1991: 183, Holotype							
1. ♂	34.5	25.5	12.5	11.5	0.74	0.36	0.33
MNHU—13498 Bambulae, Paratype							
2. ♂	28.5	20.0	10.3	9.2	0.70	0.36	0.32
MNHU—13593 Fsou Grassland, Paratypes							
3. ♂	36.9	25.3	12.1	12.1	0.67	0.33	0.33
4. ♂	33.9	24.6	11.6	11.0	0.73	0.34	0.32
5. ♀	31.1	22.1	10.2	10.2	0.71	0.33	0.33
6. ♀	23.7	16.5	7.3	7.3	0.70	0.31	0.31
MNHU—14141 Yaounde, Paratype							
7. ♀	24.6	17.8	8.6	8.3	0.72	0.35	0.34
MNHU—20162 Bamenda, Paratype							
8. ♂	35.5	24.9	11.6	10.7	0.70	0.33	0.30
MNHU—20183 Bamenda, Paratype							
9. ♀	29.9	21.0	11.7	9.9	0.70	0.39	0.33
10. ♀	20.3	15.1	7.0	7.0	0.74	0.34	0.34
MNHU—20201, Paratype							
11. ♂	35.4	24.5	12.0	11.2	0.69	0.34	0.32
MNHU—20203 Douala, Paratypes							
12. ♂	38.1	27.1	12.4	12.1	0.71	0.33	0.32
13. ♂	30.9	22.0	10.2	10.1	0.71	0.33	0.33
14. ♀	37.8	27.1	11.7	11.3	0.72	0.31	0.30
15. ♀	30.5	21.9	10.5	10.0	0.72	0.34	0.33
16. ♀	28.4	20.4	9.5	9.2	0.72	0.33	0.32

Table 2 *Potamonemus mambilorum* sp. n. length of the legs of the type from Cameroon (CW = 34.5 mm). P1–P5 = pereiopods 1–5; 1 = length of segment; Total Leg Length = sum of length of all five segments; Proportion Total/CW = ratio of total leg length to carapace width.

Leg No.	P1	P2	P3	P4	P5
Segment					
Ishium	4.0	4.0	4.0	4.0	3.0
Merus	12.0	12.0	16.0	16.0	12.5
Carpus	17.0	7.0	8.0	8.0	8.0
Propodus	37.0	8.0	7.0	8.0	7.0
Dactylus	26.0	10.0	10.0	11.0	8.0
Total Leg Length (mm)	96.0	41.0	45.0	47.0	38.5
Proportion Total/CW	2.78	1.19	1.30	1.36	1.12

end segment. End segment of gonopod 2 very short (one tenth the length of the penultimate segment); end segment of gonopod 1 curving outwards away from the medial line when viewed from the lateral aspect; end segment of gonopod 1 with a longitudinal groove on posterior aspect. Second sternal

groove incomplete, reduced to two short notches at the lateral edges of the sternum at the bases of the chelipeds.

HOLOTYPE. NHM reg. 1991:183, from Somié Village, Tikow Plain, Cameroon (6°30'N, 11°30'E), 760 metres. Collected by David Zeitlin.

Potamonemus mambilorum sp. n.
(Figs 1–3, Tabs 1–2, pl. 1a, b)

Potamonectes anchetiae; Balss 1929:117 (part).

Potamonectes (Isopotamonectes) anchetiae; Bott 1955:247 (part).

DIAGNOSIS. Major (right) cheliped of male enlarged, longer and higher than left (minor) cheliped, dactylus of cheliped arched forming permanent gape between the fingers when the chelipeds are closed; end segment of gonopod 1 with curving longitudinal groove on posterior surface; exorbital and epibranchial teeth small and low; vertical flank groove meeting anterolateral margin at the base of the epibranchial tooth; carapace smooth, no deep grooves.

DISTRIBUTION. The forested highlands of southwest Cameroon (Bamenda, Bambulae, Fsou Grasslands), and the forested lowlands of south Cameroon (Douala, Yaounde).

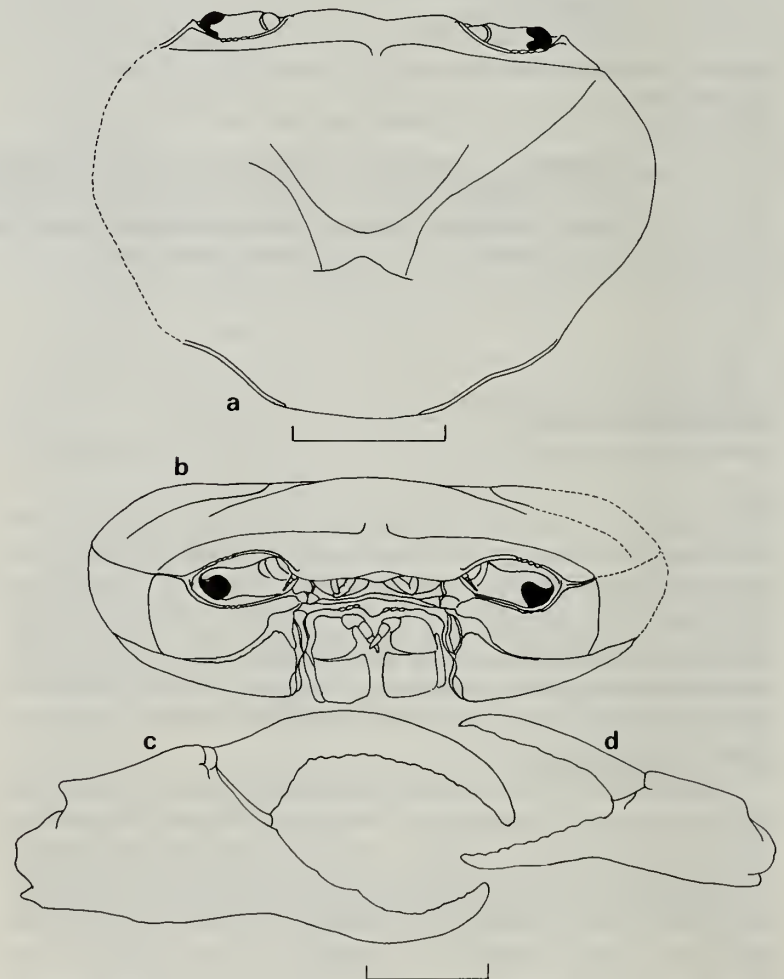


Fig. 1 *Potamonemus mambilorum* sp. n., from Tikow Plain, Cameroon, male, type, carapace width = 34.5 mm. a, cephalothorax, dorsal aspect; b, cephalothorax, frontal aspect; c, right cheliped, lateral aspect; d, left cheliped, lateral aspect. Scale bars equal 10.0 mm.

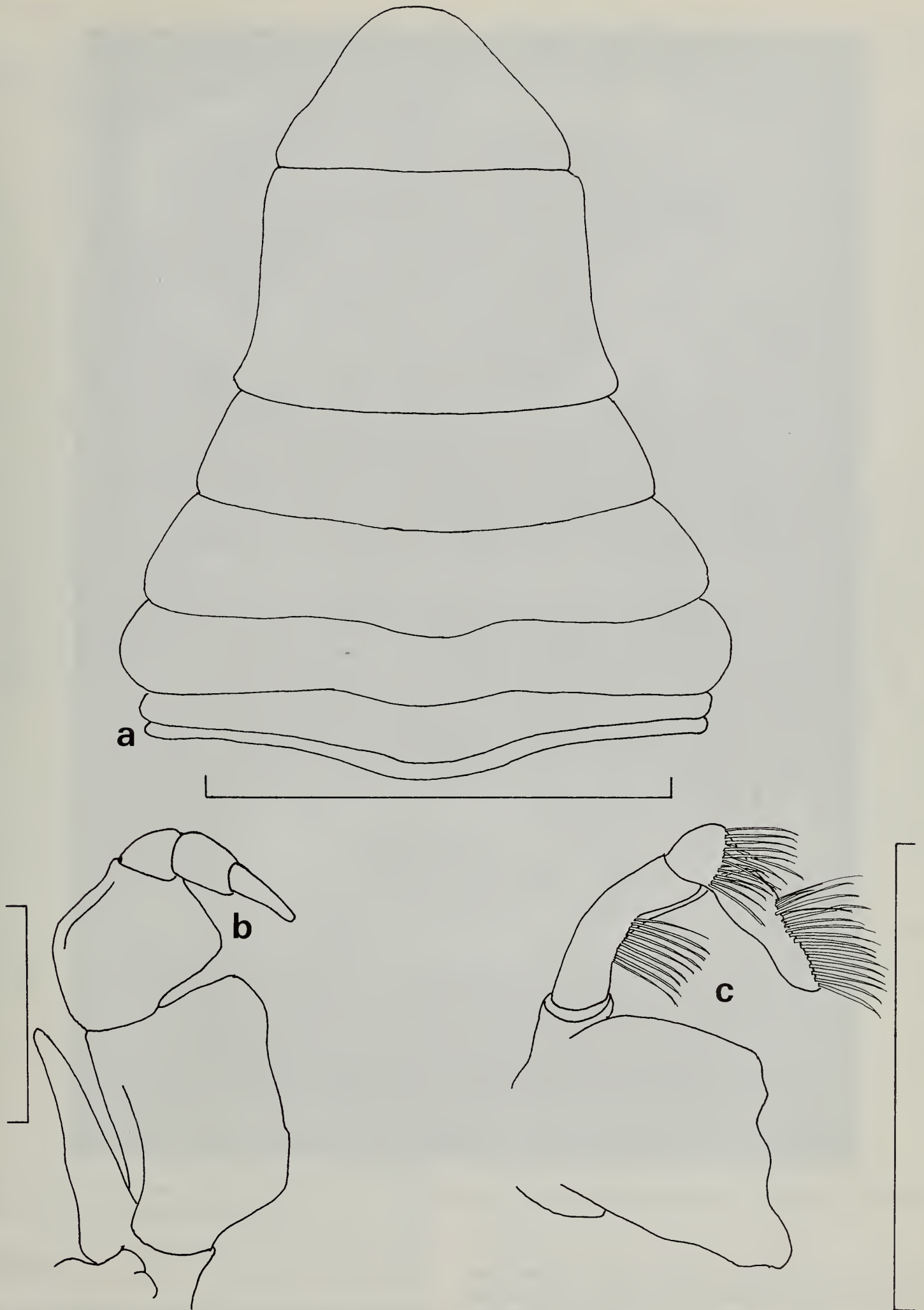


Fig. 2 *Potamonemus mambilorum* sp. n., from Tikow Plain, Cameroon, male, type, carapace width = 34.5 mm. a, abdomen; b, right third maxilliped showing details of the exopod; c, right mandible showing details of palp. Scale bars equal 10.0 mm (a), 5.0 mm (b, c).

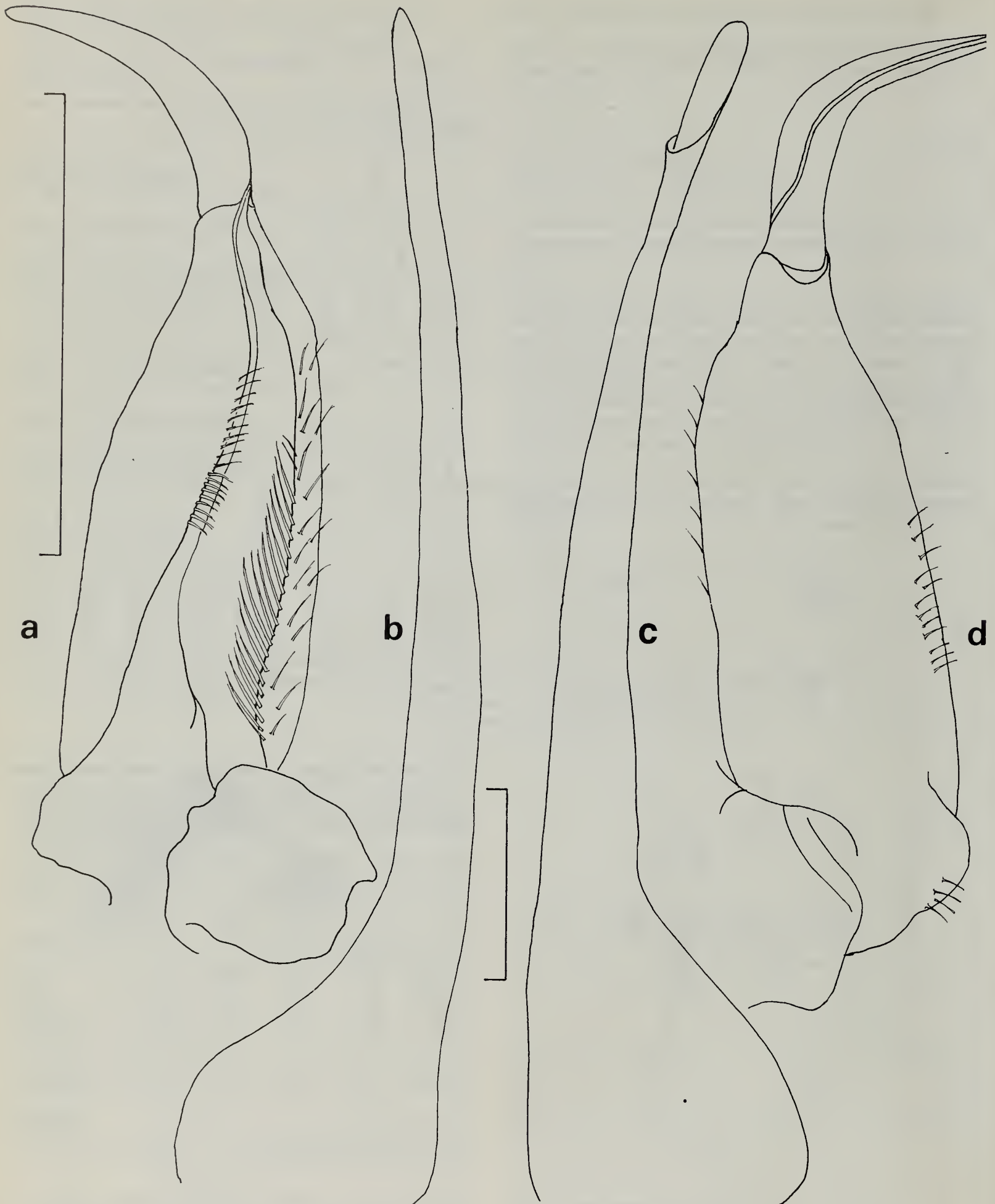


Fig. 3 *Potamonemus mambilorum* sp. n., from Tikow Plain, Cameroon, male, type, carapace width = 34.5 mm. a, right gonopod 1, ventral aspect; b, right gonopod 2, ventral aspect; c, right gonopod 2, dorsal aspect; d, right gonopod 1, dorsal aspect showing groove. Scale bars equal 5.0 mm (a,d), 1.0 mm (b,c).

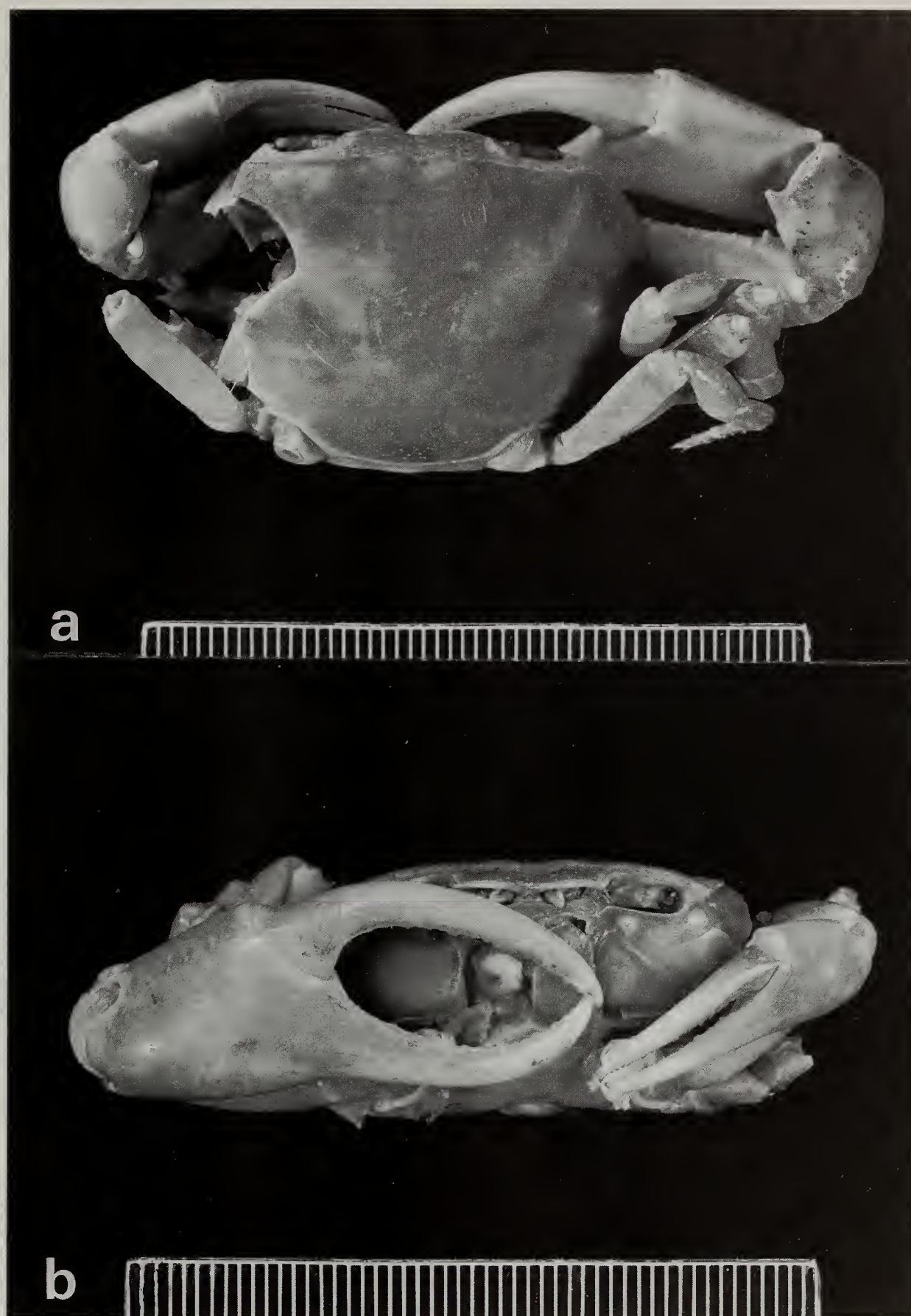


Plate 1.a, *Potamonemus mambilorum* sp. n. Dorsal view, scale bar in mm; b, *Potamonemus mambilorum* sp. n. Frontal view, scale bar in mm. Photos by Phil Crabb, NHM Photo Unit.

MATERIAL

HOLOTYPE. NHM reg. 1991:183. **Paratypes:** Fifteen additional specimens of *P. mambilorum* are held in the MNHU. All re-identified by one of the authors (NC). This material

was formerly identified as *Potamonautes anchetiae* Brito-Capello 1871 by Dr H. Balss. MNHU-13498, from Bambulae near Bamenda, Cameroon, Collected by Oberl. Ader, 2/IV/1909, 1m; MNHU-13593, from Fsou Grassland 1100m, Cameroon, Collected by Oberl. Bartsch, 2m, 2f; MNHU-

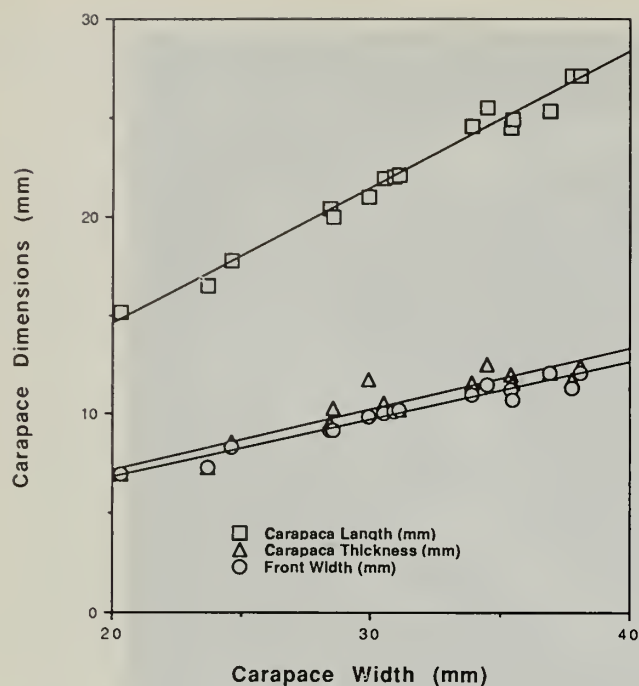


Fig. 4 Comparisons of 16 specimens of *Potamonemus mambilorum* sp. n. ranging in size from CW = 20.30 mm to 37.8 mm, all from Cameroon. Dimensions of the carapace (CL, CT, FW) compared to body size (CW). Relationships are described by the following regression equations: CL = $0.77 + 0.619$ CW, $r = 0.99$; CT = $0.97 + 0.31$ CW, $r = 0.933$; FW = $1.06 + 0.29$ CW, $r = 0.975$. All r values indicate a highly significant correlation ($P < 0.001$), at 14 degrees of freedom. CW = carapace width at the widest point; CL = carapace length, measured along the median line; CT = cephalothorax thickness, the maximum depth of the cephalothorax; FW = front width, the width of the front measured along the anterior margin; r - correlation coefficient.

14141, from Yaounde station, south Cameroon, Collected by Oberl. v. Somerfeld, 1f; MNHU-20162, from Bamenda, Cameroon. Collected by Adametz and Naumann, 12/XI/1909, 1m; MNHU-20183, from Bamenda, Cameroon. Collected by Lt Naumann, 15/I/1912, 2f; MNHU-20201, from Cameroon. Collected by Weibel, 1m; MNHU-20203, from Douala, Cameroon. Collected by Thorbecke, 29/X/1912, 2m, 3f.

DESCRIPTION

The following description is based on the male holotype (NHM reg. 1991:183, CW = 34.5 mm).

CARAPACE (Figs 1a,b; Tab. 1; pl. 1a,b). The cephalothorax is ovoid, widest at the anterior third (ratio of CL to CW = 0.36) and distinctly arched, with the maximum depth in the anterior region (ratio of CT to CW = 0.74). The anterior margin of the front is straight and wide, one-third the width of the carapace (ratio of FW to CW = 0.33). The carapace texture is smooth, no granules are visible, even under magnification, and there are no deep grooves; the cervical and semi-circular grooves are faint. The exorbital tooth is blunt and low and the epibranchial tooth is almost undetectable. There is no detectable intermediate tooth on the anterolateral margin between the exorbital and epibranchial teeth. The anterolateral margin is smooth (lacking teeth, spines, or granulations) behind the epibranchial tooth,

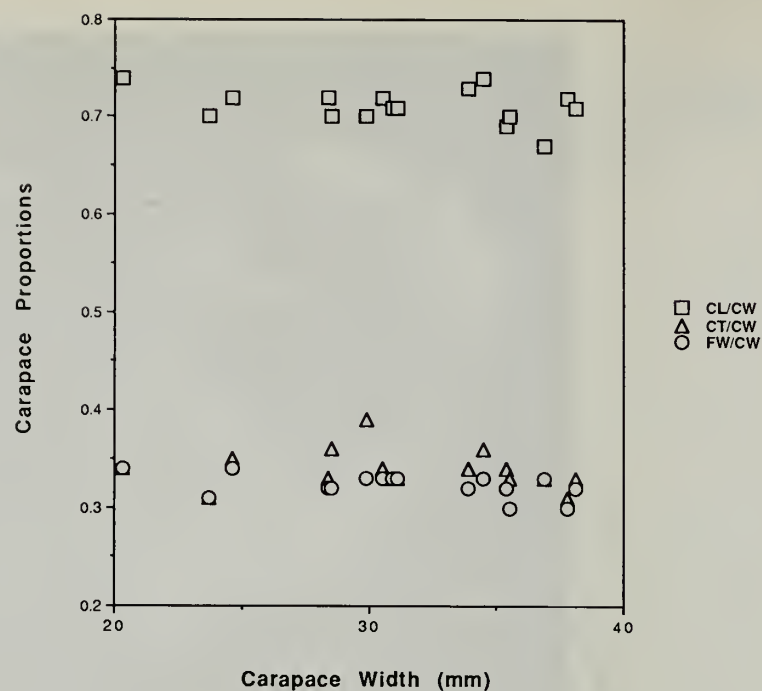


Fig. 5 Comparisons of 16 specimens of *Potamonemus mambilorum* sp. n. ranging in size from CW = 20.30 mm to 37.8 mm, all from Cameroon. Relative proportions of the carapace (CL/CW, CT/CW, and FW/CW) compared to body size (CW). The relationships are described by the following regression equations: CL/CW = $0.745 - 0.001$ CW, $r = 0.313$; CT/CW = $0.356 - 0.001$ CW, $r = 0.148$; FW/CW = $0.356 - 0.001$ CW, $r = 0.456$. The r values for CL/CW, CT/CW, and FW/CW indicate no significant correlation ($P > 0.05$), at 14 degrees of freedom. CW = carapace width at the widest point; CL = carapace length, measured along the median line; CT = cephalothorax thickness, the maximum depth of the cephalothorax; FW = front width, the width of the front measured along the anterior margin; r = correlation coefficient.

and this margin is smoothly continuous with the posterior margin. The anterolateral margins do not curve inward over the surface of the carapace in the branchial regions. The postfrontal crest extends laterally across the entire carapace, meeting both anterolateral margins at the epibranchial teeth; there is a short groove at the mid point of the postfrontal crest.

Each flank has a long longitudinal groove dividing the subhepatic region from the pterygostomial region, and a shorter vertical groove in the subhepatic region beginning at the longitudinal groove and ending at the anterolateral margin at the base of the epibranchial tooth. These two grooves divide the flanks into three parts. The first sternal groove is complete, and the second sternal groove is reduced to two small notches at the sides of the sternum. The third maxillipeds fill the entire oral field, except for the efferent openings, which are oval. There is no flagellum on the exopod of the third maxilliped (Fig. 2b). The mandibular palp is two-segmented with a single, undivided, end segment (Fig. 2c). The first five segments of the male abdomen are broad but short and taper inward; the last two segments are long and narrow (A6, A7), the last segment (A7) is rounded at the distal margin (Fig. 2a). A small to medium-sized species, mature at CW = 29.0 mm.

GONOPODS (Figs 3a,d). The end segment of gonopod 1 is long, (half as long as penultimate segment), lacking a longitudinal groove on the anterior surface, but with a twisting

longitudinal groove visible on the posterior surface, running from the junction with the penultimate segment to the tip of the end segment. The end segment of gonopod 1 curves outwards away from the medial line when viewed from the lateral aspect, is widest at the half way point, and ends in a pointed tip. The distal region of the penultimate segment of gonopod 1 is slim, tapering to the junction with the end segment. Gonopod 2 is shorter than gonopod 1 (reaching only the junction between the segments of gonopod 1). The end segment of gonopod 2 is extremely short, only one-tenth as long as the penultimate segment. The end segment of gonopod 2 is not solid, its sides are thin and folded inward enclosing an inward-facing hollow; the tip is rounded. The penultimate segment of gonopod 2 is widest at its base, tapering sharply inward about one-third along its length, the last two-thirds form a long, thin, tapering, upright process which supports the end segment.

CHELIPEDS (Figs 1c,d; pl. 1b). The chelipeds of the male are markedly unequal, the right is much longer (37.0 mm) and higher (14.5 mm) than the left (26.5 mm and 8.5 mm respectively). The length of the ventral margin of the propodus of the right cheliped alone (37.0 mm) is greater than the width of the carapace at its widest point (34.5 mm). The palm of the right dactylus is swollen, the fingers gape widely when closed; the ends of the dactylus and pollex end in sharp, overlapping points (pollex over dactylus). The left cheliped is small, and lacks the arched dactylus and swollen palmar region; its dactylus and pollex touch along the entire length when closed except for a small gap in the proximal region. The pereiopods are slender and the proportions of the various segments are given in Table 2; P4 is the longest leg, P5 the shortest leg; the dactylus of P5 is very short.

GROWTH. The dimensions of the carapace (CL, CT and FW) of *P. mambilorum* increase with increasing body size (CW) in the manner described in Fig. 4. The carapace thickness was found to be almost equal to the front width over the range of sizes from CW = 20.3 mm to CW = 38.1 mm. These dimensions are expressed as a ratio of the carapace width in Fig. 5, which indicates that the relative proportions of the carapace (CL/CW, CT/CW and FW/CW) do not alter with increasing body size. The *r* values of 0.313, 0.148 and 0.456 respectively showed no significant correlation ($P > 0.05$, d.f. = 14) over a range of sizes, indicating that larger crabs have proportionally the same sized carapaces as smaller specimens (Fig. 5).

ECOLOGICAL NOTES

The collector of the type specimen provided the following comments on the crab. *Potamonemus mambilorum* is a riverine crab and is eaten by the Mambila tribe especially during the dry season, when crabs are caught by bailing out drying sections of river beds. The Mambila people call this species the 'Kap' crab. A second species of freshwater crab is sympatric with *P. mambilorum* and was identified as *Sudanonautes faradjensis* (Rathbun, 1921). The local name for this species is the 'Nyar' crab.

TAXONOMIC REMARKS

Not all of the material assigned by Balss (1929) to *Potamonantes anchetiae* Brito-Capello 1871 was examined because the MNHU only has 15 specimens of the original Cameroon collection. It is these that are redescribed here as *Potamonemus mambilorum*. Bott (1955) has referred the MNHU material identified by Balss to *Potamonantes (Isopotamonantes) anchetiae* together with additional specimens collected from Zaire. However the specimens from Zaire and Cameroon differ. For example, the specimens from Zaire possess two deep sternal grooves, the anterolateral margin of the carapace curves inward over the surface of the carapace in the branchial region, and they have a thread-shaped end segment on gonopod two. In contrast, in the specimens from Cameroon only the first sternal groove is deep and clear, the second is absent except for two side notches, the anterolateral margin is continuous with the posterolateral margin, and the end segment of gonopod 2 is very short indeed.

Potamonemus mambilorum has a two-segmented mandibular palp, with a single (simple) end segment, which places it in the superfamily Potamoidea and the family Potamonautidae, rather than in the Gecarcinucoidea. This new species could not be assigned to any genera of the Potamonautidae (*Potamonantes*, *Sudanonautes* and *Liberonautes*) for the following reasons. *Potamonantes* and *Liberonautes* are characterised by a long thread-like end segment of gonopod 2. The short end segment of gonopod 2 of *P. mambilorum* prevents the inclusion of this species in *Potamonantes* and *Liberonautes* (Bott, 1955; Cumberlidge, 1985; Cumberlidge and Sachs, 1989a,b). The very short end segment of gonopod 2 is a characteristic of *Sudanonautes*. However, the Cameroon material cannot be assigned to *Sudanonautes* since all specimens lack a flagellum on the exopod of the third maxilliped, a character considered here and elsewhere to be of taxonomic significance at the genus level and above (Bott, 1959, 1969, 1970; Cumberlidge, 1987). In addition, *P. mambilorum* lacks an intermediate tooth, the presence of which is another characteristic of *Sudanonautes*. These features justify the recognition of a new genus.

ETYMOLOGY. The new genus has been named *Potamonemus* to recognise the distribution of the species in a tropical rain forest habitat. The species is restricted to a forested highland area of southwest Cameroon and a forested lowland area in south Cameroon. These areas are included within the boundaries of one of Africa's Pleistocene forest refuges (Kingdon, 1989). *Potamonemus* (Neuter) from the Greek; Potamo a contraction of the family name and nemos meaning forest. The species has been named for the Mambila people of Cameroon who know *Potamonemus mambilorum* well, and use this species as a seasonal food source.

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